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EXAMINER

LOUIE, OSCAR A

ART UNIT	PAPER NUMBER
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2109

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/05/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/697,309

Applicant(s)

LEGNAIN ET AL.

Examiner

Oscar A. Louie

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

This first non-final action is in response to the original filing of 10/31/2003. Claims 1-29 are pending and have been considered as follows.

Drawings

1. The drawings are objected to because Fig 1 and Fig 2 contain missing elements before and after the XOR gate in the figures respectively. Fig 1 appears to have a line missing connecting the "Full C/I Update" path to the rest of the diagram. The line leading from the "Differential Update" contains a break in the connection points to the XOR gate, which causes a lack of clarity. Fig 2 also appears to have a line missing connecting the XOR gate to the "Symbol De-Repetition" feature. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

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the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: Page 3 line 14 discloses, "a method of decoding M x N (symbols in which." The "(" should be omitted as there is a lack of a matching closing ")" to enable the use of parenthesis. Appropriate correction is required.

Claim Objections

3. Claims 1 & 16 are objected to because of the following informalities: Claims 1 and 16 both discloses, "of decoding M x N (symbols." It is recommended by the examiner that the "(" should be omitted as there is a lack of a matching closing ")" to enable the use of parenthesis. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Gilhousen (US-5103459-A).

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Claims 1 & 16:

Gilhausen discloses a method and an apparatus for decoding $M \times N$ (symbols in which a first codeword of length N of a first set of K codewords has been spread by a second codeword of length M of a second set of L codewords, the first codeword identifying a first information and the second codeword identifying a second information comprising,

- "All signals transmitted by a cell or one of the sectors of the cell share the same outer PN codes for the I and Q channels. The signals are also spread with an inner orthogonal code generated by using Walsh functions. A signal addressed to a particular user is multiplied by the outer PN sequences and by a particular Walsh sequence, or sequence of Walsh sequences, assigned by the system controller for the duration of the user's telephone call. The same inner code is applied to both the I and Q channels resulting in a modulation which is effectively bi-phase for the inner code.

It is well known in the art that a set of n orthogonal binary sequences, each of length n , for n any power of 2 can be constructed, see Digital Communications with Space Applications, S. W. Golomb et al., Prentice-Hall, Inc, 1964, pp. 45-64. In fact, orthogonal binary sequence sets are also known for most lengths which are multiples of four and less than two hundred. One class of such sequences that is easy to generate is called the Walsh function, also known as Hadamard matrices.

A Walsh function of order n can be defined recursively as follows: $W(1) = 1$ where W' denotes the logical complement of W , and $W(2n) = W(n) \cdot W'(n)$.

Thus, ##EQU2## $W(8)$ is as follows: ##EQU3## A Walsh sequence is one of the rows of a Walsh function matrix. A Walsh function of order n contains n sequences, each of length n bits.

A Walsh function of order n (as well as other orthogonal functions) has the property that over the interval of n code symbols, the cross-correlation between all the different sequences within the set is zero, provided that the sequences are time aligned with each other. This can be seen by noting that every sequence differs from every other sequence in exactly half of its bits. It should also be noted that there is always one sequence containing all zeroes and that all the other sequences contain half ones and half zeroes.

Neighboring cells and sectors can reuse the Walsh sequences because the outer PN codes used in neighboring cells and sectors are distinct. Because of the differing propagation times for signals between a particular mobile's location and two or more different cells, it is not possible to satisfy the condition of time alignment required for Walsh function orthogonality for both cells at one time. Thus, reliance must be placed on the outer PN code to provide discrimination between signals arriving at the mobile unit from different cells. However, all the signals transmitted by a cell are orthogonal to each other and thus do not contribute interference to each other. This eliminates the majority of the interference in most locations, allowing a higher capacity to be obtained" (i.e. "performing a first parallel code multiplying operation" and "performing a respective second parallel code multiplying operation") [column 10 lines 4-68 & column 11 lines 1-17].

- "The pilot signal transmitted by each sector of each cell is of the same spreading code but with a different code phase offset. Phase offset allows the pilot signals to be distinguished from one another thus distinguishing originating cell-sites or sectors. Use of the same pilot signal code allows the mobile unit to find system timing synchronization by a single search through all pilot signal code phases. The strongest pilot signal, as determined by a correlation process for each code phase, is readily identifiable. The identified strongest pilot signal generally corresponds to the pilot signal transmitted by the nearest cell-site. However, the strongest pilot signal is used whether or not it is transmitted by the closest cell-site.

Upon acquisition of the strongest pilot signal, i.e. initial synchronization of the mobile unit with the strongest pilot signal, the mobile unit searches for another carrier intended to be received by all system users in the cell. This carrier, called the synchronization channel, transmits a broadcast message containing system information for use by the mobiles in the system. The system information identifies the cell-site and the system in addition to conveying information which allows the long PN codes, interleaver frames, vocoders and other system timing information used by the mobile mobile unit to be synchronized without additional searching. Another channel, called the paging channel may also be provided to transmit messages to mobiles indicating that a call has arrived for them, and to respond with channel assignments when a mobile initiates a call.

The mobile unit continues to scan the received pilot carrier signal code at the code offsets corresponding to cell-site neighboring sector or neighboring transmitted pilot

signals. This scanning is done in order to determine if a pilot signal emanating from a neighboring sector or cell is becoming stronger than the pilot signal first determined to be strongest. If, while in this call inactive mode, a neighbor sector or neighbor cell-site pilot signal becomes stronger than that of the initial cell-site sector or cell-site transmitted pilot signal, the mobile unit will acquire the stronger pilot signals and corresponding sync and paging channel of the new sector or cell-site.

When a call is initiated, a pseudonoise (PN) code address is determined for use during the course of this call. The code address may be either assigned by the cell-site or be determined by prearrangement based upon the identity of the mobile unit. After a call is initiated the mobile unit continues to scan the pilot signal transmitted by the cell-site through which communications are established in addition to pilot signal of neighboring sectors or cells. Pilot signal scanning continues in order to determine if one of the neighboring sector or cell transmitted pilot signals becomes stronger than the pilot signal transmitted by the cell-site the mobile unit is in communication with. When the pilot signal associated with a neighboring cell or cell sector becomes stronger than the pilot signal of the current cell or cell sector, it is an indication to the mobile unit that a new cell or cell sector has been entered and that a handoff should be initiated" (i.e. "overall maximum of the second output symbols output of said second parallel code multiplying operations") [column 5 lines 63-68 & column 6 lines 1-55].

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Claims 2 & 17:

Gilhausen discloses a method and an apparatus for decoding $M \times N$ (symbols in which a first codeword of length N of a first set of K codewords has been spread by a second codeword of length M of a second set of L codewords, the first codeword identifying a first information and the second codeword identifying a second information as in Claims 1 & 16 respectively above comprising,

- "All signals transmitted by a cell or one of the sectors of the cell share the same outer PN codes for the I and Q channels. The signals are also spread with an inner orthogonal code generated by using Walsh functions. A signal addressed to a particular user is multiplied by the outer PN sequences and by a particular Walsh sequence, or sequence of Walsh sequences, assigned by the system controller for the duration of the user's telephone call. The same inner code is applied to both the I and Q channels resulting in a modulation which is effectively bi-phase for the inner code.

It is well known in the art that a set of n orthogonal binary sequences, each of length n , for n any power of 2 can be constructed, see Digital Communications with Space Applications, S. W. Golomb et al., Prentice-Hall, Inc, 1964, pp. 45-64. In fact, orthogonal binary sequence sets are also known for most lengths which are multiples of four and less than two hundred. One class of such sequences that is easy to generate is called the Walsh function, also known as Hadamard matrices.

A Walsh function of order n can be defined recursively as follows: ##EQU1## where W' denotes the logical complement of W , and $W(1) = \text{.vertline.0.vertline.}$.

Thus, ##EQU2## $W(8)$ is as follows: ##EQU3## A Walsh sequence is one of the rows of a Walsh function matrix. A Walsh function of order n contains n sequences, each of length n bits.

A Walsh function of order n (as well as other orthogonal functions) has the property that over the interval of n code symbols, the cross-correlation between all the different sequences within the set is zero, provided that the sequences are time aligned with each other. This can be seen by noting that every sequence differs from every other sequence in exactly half of its bits. It should also be noted that there is always one sequence containing all zeroes and that all the other sequences contain half ones and half zeroes.

Neighboring cells and sectors can reuse the Walsh sequences because the outer PN codes used in neighboring cells and sectors are distinct. Because of the differing propagation times for signals between a particular mobile's location and two or more different cells, it is not possible to satisfy the condition of time alignment required for Walsh function orthogonality for both cells at one time. Thus, reliance must be placed on the outer PN code to provide discrimination between signals arriving at the mobile unit from different cells. However, all the signals transmitted by a cell are orthogonal to each other and thus do not contribute interference to each other. This eliminates the majority of the interference in most locations, allowing a higher capacity to be obtained" (i.e. "the first code is a Walsh code, and the second parallel code multiplying operation comprises a FHT") [column 10 lines 4-68 & column 11 lines 1-17].

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Claims 3 & 18:

Gilhousen discloses a method and an apparatus for decoding $M \times N$ (symbols in which a first codeword of length N of a first set of K codewords has been spread by a second codeword of length M of a second set of L codewords, the first codeword identifying a first information and the second codeword identifying a second information as in Claims 1 & 16 respectively above comprising,

- "All signals transmitted by a cell or one of the sectors of the cell share the same outer PN codes for the I and Q channels. The signals are also spread with an inner orthogonal code generated by using Walsh functions. A signal addressed to a particular user is multiplied by the outer PN sequences and by a particular Walsh sequence, or sequence of Walsh sequences, assigned by the system controller for the duration of the user's telephone call. The same inner code is applied to both the I and Q channels resulting in a modulation which is effectively bi-phase for the inner code.

It is well known in the art that a set of n orthogonal binary sequences, each of length n , for n any power of 2 can be constructed, see Digital Communications with Space Applications, S. W. Golomb et al., Prentice-Hall, Inc, 1964, pp. 45-64. In fact, orthogonal binary sequence sets are also known for most lengths which are multiples of four and less than two hundred. One class of such sequences that is easy to generate is called the Walsh function, also known as Hadamard matrices.

A Walsh function of order n can be defined recursively as follows: ##EQU1## where W' denotes the logical complement of W , and $W(1) = \begin{smallmatrix} 1 \\ 0 \end{smallmatrix}$.

Thus, $W(8)$ is as follows: A Walsh sequence is one of the rows of a Walsh function matrix. A Walsh function of order n contains n sequences, each of length n bits.

A Walsh function of order n (as well as other orthogonal functions) has the property that over the interval of n code symbols, the cross-correlation between all the different sequences within the set is zero, provided that the sequences are time aligned with each other. This can be seen by noting that every sequence differs from every other sequence in exactly half of its bits. It should also be noted that there is always one sequence containing all zeroes and that all the other sequences contain half ones and half zeroes.

Neighboring cells and sectors can reuse the Walsh sequences because the outer PN codes used in neighboring cells and sectors are distinct. Because of the differing propagation times for signals between a particular mobile's location and two or more different cells, it is not possible to satisfy the condition of time alignment required for Walsh function orthogonality for both cells at one time. Thus, reliance must be placed on the outer PN code to provide discrimination between signals arriving at the mobile unit from different cells. However, all the signals transmitted by a cell are orthogonal to each other and thus do not contribute interference to each other. This eliminates the majority of the interference in most locations, allowing a higher capacity to be obtained" (i.e. "the first code is a truncated Walsh code, the method further comprising padding each set of N consecutive output symbols to a power of 2, wherein the second parallel code multiplying operation comprises a FHT") [column 10 lines 4-68 & column 11 lines 1-17].

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Claims 4 & 19:

Gilhausen discloses a method and an apparatus for decoding $M \times N$ (symbols in which a first codeword of length N of a first set of K codewords has been spread by a second codeword of length M of a second set of L codewords, the first codeword identifying a first information and the second codeword identifying a second information as in Claims 1 & 16 respectively above comprising,

- "All signals transmitted by a cell or one of the sectors of the cell share the same outer PN codes for the I and Q channels. The signals are also spread with an inner orthogonal code generated by using Walsh functions. A signal addressed to a particular user is multiplied by the outer PN sequences and by a particular Walsh sequence, or sequence of Walsh sequences, assigned by the system controller for the duration of the user's telephone call. The same inner code is applied to both the I and Q channels resulting in a modulation which is effectively bi-phase for the inner code.

It is well known in the art that a set of n orthogonal binary sequences, each of length n , for n any power of 2 can be constructed, see Digital Communications with Space Applications, S. W. Golomb et al., Prentice-Hall, Inc, 1964, pp. 45-64. In fact, orthogonal binary sequence sets are also known for most lengths which are multiples of four and less than two hundred. One class of such sequences that is easy to generate is called the Walsh function, also known as Hadamard matrices.

A Walsh function of order n can be defined recursively as follows: $W_n = W_{n/2} \oplus W_{n/2}'$ where W' denotes the logical complement of W , and $W(1) = 1$.

Thus, $W(8)$ is as follows: A Walsh sequence is one of the rows of a Walsh function matrix. A Walsh function of order n contains n sequences, each of length n bits.

A Walsh function of order n (as well as other orthogonal functions) has the property that over the interval of n code symbols, the cross-correlation between all the different sequences within the set is zero, provided that the sequences are time aligned with each other. This can be seen by noting that every sequence differs from every other sequence in exactly half of its bits. It should also be noted that there is always one sequence containing all zeroes and that all the other sequences contain half ones and half zeroes.

Neighboring cells and sectors can reuse the Walsh sequences because the outer PN codes used in neighboring cells and sectors are distinct. Because of the differing propagation times for signals between a particular mobile's location and two or more different cells, it is not possible to satisfy the condition of time alignment required for Walsh function orthogonality for both cells at one time. Thus, reliance must be placed on the outer PN code to provide discrimination between signals arriving at the mobile unit from different cells. However, all the signals transmitted by a cell are orthogonal to each other and thus do not contribute interference to each other. This eliminates the majority of the interference in most locations, allowing a higher capacity to be obtained" (i.e. "the second code is a Walsh code, and the first parallel code multiplying operation comprises a FHT") [column 10 lines 4-68 & column 11 lines 1-17].

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Claims 5 & 20:

Gilhausen discloses a method and an apparatus for decoding $M \times N$ (symbols in which a first codeword of length N of a first set of K codewords has been spread by a second codeword of length M of a second set of L codewords, the first codeword identifying a first information and the second codeword identifying a second information as in Claims 1 & 16 respectively above comprising,

- "All signals transmitted by a cell or one of the sectors of the cell share the same outer PN codes for the I and Q channels. The signals are also spread with an inner orthogonal code generated by using Walsh functions. A signal addressed to a particular user is multiplied by the outer PN sequences and by a particular Walsh sequence, or sequence of Walsh sequences, assigned by the system controller for the duration of the user's telephone call. The same inner code is applied to both the I and Q channels resulting in a modulation which is effectively bi-phase for the inner code.

It is well known in the art that a set of n orthogonal binary sequences, each of length n , for n any power of 2 can be constructed, see Digital Communications with Space Applications, S. W. Golomb et al., Prentice-Hall, Inc, 1964, pp. 45-64. In fact, orthogonal binary sequence sets are also known for most lengths which are multiples of four and less than two hundred. One class of such sequences that is easy to generate is called the Walsh function, also known as Hadamard matrices.

A Walsh function of order n can be defined recursively as follows: ##EQU1## where W' denotes the logical complement of W , and $W(1) = \text{.vertline.0.vertline.}$.

Thus, $W(8)$ is as follows: A Walsh sequence is one of the rows of a Walsh function matrix. A Walsh function of order n contains n sequences, each of length n bits.

A Walsh function of order n (as well as other orthogonal functions) has the property that over the interval of n code symbols, the cross-correlation between all the different sequences within the set is zero, provided that the sequences are time aligned with each other. This can be seen by noting that every sequence differs from every other sequence in exactly half of its bits. It should also be noted that there is always one sequence containing all zeroes and that all the other sequences contain half ones and half zeroes.

Neighboring cells and sectors can reuse the Walsh sequences because the outer PN codes used in neighboring cells and sectors are distinct. Because of the differing propagation times for signals between a particular mobile's location and two or more different cells, it is not possible to satisfy the condition of time alignment required for Walsh function orthogonality for both cells at one time. Thus, reliance must be placed on the outer PN code to provide discrimination between signals arriving at the mobile unit from different cells. However, all the signals transmitted by a cell are orthogonal to each other and thus do not contribute interference to each other. This eliminates the majority of the interference in most locations, allowing a higher capacity to be obtained" (i.e. "the second code is an orthogonal code") [column 10 lines 4-68 & column 11 lines 1-17].

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Claims 6 & 21:

Gilhousen discloses a method and an apparatus for decoding $M \times N$ (symbols in which a first codeword of length N of a first set of K codewords has been spread by a second codeword of length M of a second set of L codewords, the first codeword identifying a first information and the second codeword identifying a second information as in Claims 1 & 16 respectively above comprising,

- "All signals transmitted by a cell or one of the sectors of the cell share the same outer PN codes for the I and Q channels. The signals are also spread with an inner orthogonal code generated by using Walsh functions. A signal addressed to a particular user is multiplied by the outer PN sequences and by a particular Walsh sequence, or sequence of Walsh sequences, assigned by the system controller for the duration of the user's telephone call. The same inner code is applied to both the I and Q channels resulting in a modulation which is effectively bi-phase for the inner code.

It is well known in the art that a set of n orthogonal binary sequences, each of length n , for n any power of 2 can be constructed, see Digital Communications with Space Applications, S. W. Golomb et al., Prentice-Hall, Inc, 1964, pp. 45-64. In fact, orthogonal binary sequence sets are also known for most lengths which are multiples of four and less than two hundred. One class of such sequences that is easy to generate is called the Walsh function, also known as Hadamard matrices.

A Walsh function of order n can be defined recursively as follows: $W(1) = 1$ where W' denotes the logical complement of W , and $W(2n) = W(n) \cdot W'(n)$.

Thus, $W(8)$ is as follows: A Walsh sequence is one of the rows of a Walsh function matrix. A Walsh function of order n contains n sequences, each of length n bits.

A Walsh function of order n (as well as other orthogonal functions) has the property that over the interval of n code symbols, the cross-correlation between all the different sequences within the set is zero, provided that the sequences are time aligned with each other. This can be seen by noting that every sequence differs from every other sequence in exactly half of its bits. It should also be noted that there is always one sequence containing all zeroes and that all the other sequences contain half ones and half zeroes.

Neighboring cells and sectors can reuse the Walsh sequences because the outer PN codes used in neighboring cells and sectors are distinct. Because of the differing propagation times for signals between a particular mobile's location and two or more different cells, it is not possible to satisfy the condition of time alignment required for Walsh function orthogonality for both cells at one time. Thus, reliance must be placed on the outer PN code to provide discrimination between signals arriving at the mobile unit from different cells. However, all the signals transmitted by a cell are orthogonal to each other and thus do not contribute interference to each other. This eliminates the majority of the interference in most locations, allowing a higher capacity to be obtained" (i.e. "the second code is a Walsh code, and the first parallel code multiplying operation comprises FHT") [column 10 lines 4-68 & column 11 lines 1-17].

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Claims 7 & 22:

Gilhausen discloses a method and an apparatus for decoding $M \times N$ (symbols in which a first codeword of length N of a first set of K codewords has been spread by a second codeword of length M of a second set of L codewords, the first codeword identifying a first information and the second codeword identifying a second information as in Claims 1 & 16 respectively above comprising,

- "All signals transmitted by a cell or one of the sectors of the cell share the same outer PN codes for the I and Q channels. The signals are also spread with an inner orthogonal code generated by using Walsh functions. A signal addressed to a particular user is multiplied by the outer PN sequences and by a particular Walsh sequence, or sequence of Walsh sequences, assigned by the system controller for the duration of the user's telephone call. The same inner code is applied to both the I and Q channels resulting in a modulation which is effectively bi-phase for the inner code.

It is well known in the art that a set of n orthogonal binary sequences, each of length n , for n any power of 2 can be constructed, see Digital Communications with Space Applications, S. W. Golomb et al., Prentice-Hall, Inc, 1964, pp. 45-64. In fact, orthogonal binary sequence sets are also known for most lengths which are multiples of four and less than two hundred. One class of such sequences that is easy to generate is called the Walsh function, also known as Hadamard matrices.

A Walsh function of order n can be defined recursively as follows: ##EQU1## where W' denotes the logical complement of W , and $W(1) = \text{.vertline.0.vertline.}$.

Thus, ##EQU2## $W(8)$ is as follows: ##EQU3## A Walsh sequence is one of the rows of a Walsh function matrix. A Walsh function of order n contains n sequences, each of length n bits.

A Walsh function of order n (as well as other orthogonal functions) has the property that over the interval of n code symbols, the cross-correlation between all the different sequences within the set is zero, provided that the sequences are time aligned with each other. This can be seen by noting that every sequence differs from every other sequence in exactly half of its bits. It should also be noted that there is always one sequence containing all zeroes and that all the other sequences contain half ones and half zeroes.

Neighboring cells and sectors can reuse the Walsh sequences because the outer PN codes used in neighboring cells and sectors are distinct. Because of the differing propagation times for signals between a particular mobile's location and two or more different cells, it is not possible to satisfy the condition of time alignment required for Walsh function orthogonality for both cells at one time. Thus, reliance must be placed on the outer PN code to provide discrimination between signals arriving at the mobile unit from different cells. However, all the signals transmitted by a cell are orthogonal to each other and thus do not contribute interference to each other. This eliminates the majority of the interference in most locations, allowing a higher capacity to be obtained" (i.e. "the second code is an 8-Walsh code, and wherein the first code is a truncated Walsh code in the form of a (12,4) block code which is padded to length 16") [column 10 lines 4-68 & column 11 lines 1-17].

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Claims 8 & 23:

Gilhausen discloses a method and an apparatus for decoding $M \times N$ (symbols in which a first codeword of length N of a first set of K codewords has been spread by a second codeword of length M of a second set of L codewords, the first codeword identifying a first information and the second codeword identifying a second information as in Claims 1 & 16 respectively above comprising,

- "All signals transmitted by a cell or one of the sectors of the cell share the same outer PN codes for the I and Q channels. The signals are also spread with an inner orthogonal code generated by using Walsh functions. A signal addressed to a particular user is multiplied by the outer PN sequences and by a particular Walsh sequence, or sequence of Walsh sequences, assigned by the system controller for the duration of the user's telephone call. The same inner code is applied to both the I and Q channels resulting in a modulation which is effectively bi-phase for the inner code.

It is well known in the art that a set of n orthogonal binary sequences, each of length n , for n any power of 2 can be constructed, see Digital Communications with Space Applications, S. W. Golomb et al., Prentice-Hall, Inc, 1964, pp. 45-64. In fact, orthogonal binary sequence sets are also known for most lengths which are multiples of four and less than two hundred. One class of such sequences that is easy to generate is called the Walsh function, also known as Hadamard matrices.

A Walsh function of order n can be defined recursively as follows: ##EQU1## where W' denotes the logical complement of W , and $W(1) = \begin{smallmatrix} 1 \\ 0 \end{smallmatrix}$.

Thus, $W(8)$ is as follows: A Walsh sequence is one of the rows of a Walsh function matrix. A Walsh function of order n contains n sequences, each of length n bits.

A Walsh function of order n (as well as other orthogonal functions) has the property that over the interval of n code symbols, the cross-correlation between all the different sequences within the set is zero, provided that the sequences are time aligned with each other. This can be seen by noting that every sequence differs from every other sequence in exactly half of its bits. It should also be noted that there is always one sequence containing all zeroes and that all the other sequences contain half ones and half zeroes.

Neighboring cells and sectors can reuse the Walsh sequences because the outer PN codes used in neighboring cells and sectors are distinct. Because of the differing propagation times for signals between a particular mobile's location and two or more different cells, it is not possible to satisfy the condition of time alignment required for Walsh function orthogonality for both cells at one time. Thus, reliance must be placed on the outer PN code to provide discrimination between signals arriving at the mobile unit from different cells. However, all the signals transmitted by a cell are orthogonal to each other and thus do not contribute interference to each other. This eliminates the majority of the interference in most locations, allowing a higher capacity to be obtained" (i.e. "the first code is an 8-Walsh code, and the second code is an 8-Walsh code") [column 10 lines 4-68 & column 11 lines 1-17].

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Claims 9 & 24:

Gilhousen discloses a method and an apparatus for decoding $M \times N$ (symbols in which a first codeword of length N of a first set of K codewords has been spread by a second codeword of length M of a second set of L codewords, the first codeword identifying a first information and the second codeword identifying a second information as in Claims 1 & 16 respectively above comprising,

- "All signals transmitted by a cell or one of the sectors of the cell share the same outer PN codes for the I and Q channels. The signals are also spread with an inner orthogonal code generated by using Walsh functions. A signal addressed to a particular user is multiplied by the outer PN sequences and by a particular Walsh sequence, or sequence of Walsh sequences, assigned by the system controller for the duration of the user's telephone call. The same inner code is applied to both the I and Q channels resulting in a modulation which is effectively bi-phase for the inner code.

It is well known in the art that a set of n orthogonal binary sequences, each of length n , for n any power of 2 can be constructed, see Digital Communications with Space Applications, S. W. Golomb et al., Prentice-Hall, Inc, 1964, pp. 45-64. In fact, orthogonal binary sequence sets are also known for most lengths which are multiples of four and less than two hundred. One class of such sequences that is easy to generate is called the Walsh function, also known as Hadamard matrices.

A Walsh function of order n can be defined recursively as follows: ##EQU1## where W' denotes the logical complement of W , and $W(1) = \text{vertline}.0.\text{vertline}.$

Thus, ##EQU2## $W(8)$ is as follows: ##EQU3## A Walsh sequence is one of the rows of a Walsh function matrix. A Walsh function of order n contains n sequences, each of length n bits.

A Walsh function of order n (as well as other orthogonal functions) has the property that over the interval of n code symbols, the cross-correlation between all the different sequences within the set is zero, provided that the sequences are time aligned with each other. This can be seen by noting that every sequence differs from every other sequence in exactly half of its bits. It should also be noted that there is always one sequence containing all zeroes and that all the other sequences contain half ones and half zeroes.

Neighboring cells and sectors can reuse the Walsh sequences because the outer PN codes used in neighboring cells and sectors are distinct. Because of the differing propagation times for signals between a particular mobile's location and two or more different cells, it is not possible to satisfy the condition of time alignment required for Walsh function orthogonality for both cells at one time. Thus, reliance must be placed on the outer PN code to provide discrimination between signals arriving at the mobile unit from different cells. However, all the signals transmitted by a cell are orthogonal to each other and thus do not contribute interference to each other. This eliminates the majority of the interference in most locations, allowing a higher capacity to be obtained" (i.e. "sequence de-repetition prior to said first parallel code multiplying operation") [column 10 lines 4-68 & column 11 lines 1-17].

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Claim 10:

Gilhausen discloses a method for decoding $M \times N$ (symbols in which a first codeword of length N of a first set of K codewords has been spread by a second codeword of length M of a second set of L codewords, the first codeword identifying a first information and the second codeword identifying a second information as in Claim 1 above comprising,

- “The pilot signal transmitted by each sector of each cell is of the same spreading code but with a different code phase offset. Phase offset allows the pilot signals to be distinguished from one another thus distinguishing originating cell-sites or sectors. Use of the same pilot signal code allows the mobile unit to find system timing synchronization by a single search through all pilot signal code phases. The strongest pilot signal, as determined by a correlation process for each code phase, is readily identifiable. The identified strongest pilot signal generally corresponds to the pilot signal transmitted by the nearest cell-site. However, the strongest pilot signal is used whether or not it is transmitted by the closest cell-site.

Upon acquisition of the strongest pilot signal, i.e. initial synchronization of the mobile unit with the strongest pilot signal, the mobile unit searches for another carrier intended to be received by all system users in the cell. This carrier, called the synchronization channel, transmits a broadcast message containing system information for use by the mobiles in the system. The system information identifies the cell-site and the system in addition to conveying information which allows the long PN codes, interleaver frames, vocoders and other system timing information used by the mobile mobile unit to be synchronized without additional searching. Another channel, called the

paging channel may also be provided to transmit messages to mobiles indicating that a call has arrived for them, and to respond with channel assignments when a mobile initiates a call.

The mobile unit continues to scan the received pilot carrier signal code at the code offsets corresponding to cell-site neighboring sector or neighboring transmitted pilot signals. This scanning is done in order to determine if a pilot signal emanating from a neighboring sector or cell is becoming stronger than the pilot signal first determined to be strongest. If, while in this call inactive mode, a neighbor sector or neighbor cell-site pilot signal becomes stronger than that of the initial cell-site sector or cell-site transmitted pilot signal, the mobile unit will acquire the stronger pilot signals and corresponding sync and paging channel of the new sector or cell-site.

When a call is initiated, a pseudonoise (PN) code address is determined for use during the course of this call. The code address may be either assigned by the cell-site or be determined by prearrangement based upon the identity of the mobile unit. After a call is initiated the mobile unit continues to scan the pilot signal transmitted by the cell-site through which communications are established in addition to pilot signal of neighboring sectors or cells. Pilot signal scanning continues in order to determine if one of the neighboring sector or cell transmitted pilot signals becomes stronger than the pilot signal transmitted by the cell-site the mobile unit is in communication with. When the pilot signal associated with a neighboring cell or cell sector becomes stronger than the pilot signal of the current cell or cell sector, it is an indication to the mobile unit that a new cell or cell sector has been entered and that a handoff should be initiated" (i.e. "determining

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the first information from the codeword of the first set of codewords associated with the overall maximum output and determining the second information from the codeword of the second set of codewords associated with the overall maximum output”) [column 10 lines 4-68 & column 11 lines 1-17].

Claim 11:

Gilhausen discloses a method for decoding $M \times N$ (symbols in which a first codeword of length N of a first set of K codewords has been spread by a second codeword of length M of a second set of L codewords, the first codeword identifying a first information and the second codeword identifying a second information as in Claim 1 above comprising,

- “The pilot signal transmitted by each sector of each cell is of the same spreading code but with a different code phase offset. Phase offset allows the pilot signals to be distinguished from one another thus distinguishing originating cell-sites or sectors. Use of the same pilot signal code allows the mobile unit to find system timing synchronization by a single search through all pilot signal code phases. The strongest pilot signal, as determined by a correlation process for each code phase, is readily identifiable. The identified strongest pilot signal generally corresponds to the pilot signal transmitted by the nearest cell-site. However, the strongest pilot signal is used whether or not it is transmitted by the closest cell-site.

Upon acquisition of the strongest pilot signal, i.e. initial synchronization of the mobile unit with the strongest pilot signal, the mobile unit searches for another carrier intended to be received by all system users in the cell. This carrier, called the synchronization channel, transmits a broadcast message containing system information

for use by the mobiles in the system. The system information identifies the cell-site and the system in addition to conveying information which allows the long PN codes, interleaver frames, vocoders and other system timing information used by the mobile unit to be synchronized without additional searching. Another channel, called the paging channel may also be provided to transmit messages to mobiles indicating that a call has arrived for them, and to respond with channel assignments when a mobile initiates a call.

The mobile unit continues to scan the received pilot carrier signal code at the code offsets corresponding to cell-site neighboring sector or neighboring transmitted pilot signals. This scanning is done in order to determine if a pilot signal emanating from a neighboring sector or cell is becoming stronger than the pilot signal first determined to be strongest. If, while in this call inactive mode, a neighbor sector or neighbor cell-site pilot signal becomes stronger than that of the initial cell-site sector or cell-site transmitted pilot signal, the mobile unit will acquire the stronger pilot signals and corresponding sync and paging channel of the new sector or cell-site.

When a call is initiated, a pseudonoise (PN) code address is determined for use during the course of this call. The code address may be either assigned by the cell-site or be determined by prearrangement based upon the identity of the mobile unit. After a call is initiated the mobile unit continues to scan the pilot signal transmitted by the cell-site through which communications are established in addition to pilot signal of neighboring sectors or cells. Pilot signal scanning continues in order to determine if one of the neighboring sector or cell transmitted pilot signals becomes stronger than the pilot signal

transmitted by the cell-site the mobile unit is in communication with. When the pilot signal associated with a neighboring cell or cell sector becomes stronger than the pilot signal of the current cell or cell sector, it is an indication to the mobile unit that a new cell or cell sector has been entered and that a handoff should be initiated" (i.e. "determining the first information from the codeword of the first set of codewords associated with the overall maximum output and determining the second information from the codeword of the second set of codewords associated with the overall maximum output" and "the first information comprises a channel quality indication, and wherein the second information comprises a sector identifier") [column 10 lines 4-68 & column 11 lines 1-17].

Claim 12:

Gilhousen discloses a method for decoding $M \times N$ (symbols in which a first codeword of length N of a first set of K codewords has been spread by a second codeword of length M of a second set of L codewords, the first codeword identifying a first information and the second codeword identifying a second information as in Claim 1 above comprising,

- "The pilot signal transmitted by each sector of each cell is of the same spreading code but with a different code phase offset. Phase offset allows the pilot signals to be distinguished from one another thus distinguishing originating cell-sites or sectors. Use of the same pilot signal code allows the mobile unit to find system timing synchronization by a single search through all pilot signal code phases. The strongest pilot signal, as determined by a correlation process for each code phase, is readily identifiable. The identified strongest pilot signal generally corresponds to the pilot signal transmitted by the nearest cell-site.

However, the strongest pilot signal is used whether or not it is transmitted by the closest cell-site.

Upon acquisition of the strongest pilot signal, i.e. initial synchronization of the mobile unit with the strongest pilot signal, the mobile unit searches for another carrier intended to be received by all system users in the cell. This carrier, called the synchronization channel, transmits a broadcast message containing system information for use by the mobiles in the system. The system information identifies the cell-site and the system in addition to conveying information which allows the long PN codes, interleaver frames, vocoders and other system timing information used by the mobile mobile unit to be synchronized without additional searching. Another channel, called the paging channel may also be provided to transmit messages to mobiles indicating that a call has arrived for them, and to respond with channel assignments when a mobile initiates a call.

The mobile unit continues to scan the received pilot carrier signal code at the code offsets corresponding to cell-site neighboring sector or neighboring transmitted pilot signals. This scanning is done in order to determine if a pilot signal emanating from a neighboring sector or cell is becoming stronger than the pilot signal first determined to be strongest. If, while in this call inactive mode, a neighbor sector or neighbor cell-site pilot signal becomes stronger than that of the initial cell-site sector or cell-site transmitted pilot signal, the mobile unit will acquire the stronger pilot signals and corresponding sync and paging channel of the new sector or cell-site.

When a call is initiated, a pseudonoise (PN) code address is determined for use during the course of this call. The code address may be either assigned by the cell-site or be determined by prearrangement based upon the identity of the mobile unit. After a call is initiated the mobile unit continues to scan the pilot signal transmitted by the cell-site through which communications are established in addition to pilot signal of neighboring sectors or cells. Pilot signal scanning continues in order to determine if one of the neighboring sector or cell transmitted pilot signals becomes stronger than the pilot signal transmitted by the cell-site the mobile unit is in communication with. When the pilot signal associated with a neighboring cell or cell sector becomes stronger than the pilot signal of the current cell or cell sector, it is an indication to the mobile unit that a new cell or cell sector has been entered and that a handoff should be initiated" (i.e. "determining the first information from the codeword of the first set of codewords associated with the overall maximum output and determining the second information from the codeword of the second set of codewords associated with the overall maximum output" and "the first information comprises a data rate control indication, and wherein the second information comprises a sector identifier") [column 10 lines 4-68 & column 11 lines 1-17].

Claims 13 & 27:

Gilhausen discloses a method and an apparatus for decoding $M \times N$ (symbols in which a first codeword of length N of a first set of K codewords has been spread by a second codeword of length M of a second set of L codewords, the first codeword identifying a first information and the second codeword identifying a second information as in Claims 1 & 16 respectively above comprising,

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- "All signals transmitted by a cell or one of the sectors of the cell share the same outer PN codes for the I and Q channels. The signals are also spread with an inner orthogonal code generated by using Walsh functions. A signal addressed to a particular user is multiplied by the outer PN sequences and by a particular Walsh sequence, or sequence of Walsh sequences, assigned by the system controller for the duration of the user's telephone call. The same inner code is applied to both the I and Q channels resulting in a modulation which is effectively bi-phase for the inner code.

It is well known in the art that a set of n orthogonal binary sequences, each of length n , for n any power of 2 can be constructed, see Digital Communications with Space Applications, S. W. Golomb et al., Prentice-Hall, Inc, 1964, pp. 45-64. In fact, orthogonal binary sequence sets are also known for most lengths which are multiples of four and less than two hundred. One class of such sequences that is easy to generate is called the Walsh function, also known as Hadamard matrices.

A Walsh function of order n can be defined recursively as follows: $W(1) = 1$ where W' denotes the logical complement of W , and $W(2n) = \begin{matrix} W(n) \\ W'(n) \end{matrix}$.

Thus, $W(8)$ is as follows: $\begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & -1 & 1 & -1 & 1 & -1 \\ 1 & 1 & -1 & -1 & 1 & -1 & -1 & 1 \\ 1 & -1 & 1 & -1 & 1 & 1 & -1 & -1 \\ 1 & -1 & -1 & 1 & 1 & 1 & 1 & -1 \\ 1 & 1 & -1 & 1 & -1 & 1 & -1 & 1 \\ 1 & -1 & 1 & 1 & 1 & -1 & -1 & -1 \\ 1 & -1 & -1 & -1 & -1 & -1 & 1 & 1 \end{bmatrix}$ A Walsh sequence is one of the rows of a Walsh function matrix. A Walsh function of order n contains n sequences, each of length n bits.

A Walsh function of order n (as well as other orthogonal functions) has the property that over the interval of n code symbols, the cross-correlation between all the different sequences within the set is zero, provided that the sequences are time aligned with each

other. This can be seen by noting that every sequence differs from every other sequence in exactly half of its bits. It should also be noted that there is always one sequence containing all zeroes and that all the other sequences contain half ones and half zeroes.

Neighboring cells and sectors can reuse the Walsh sequences because the outer PN codes used in neighboring cells and sectors are distinct. Because of the differing propagation times for signals between a particular mobile's location and two or more different cells, it is not possible to satisfy the condition of time alignment required for Walsh function orthogonality for both cells at one time. Thus, reliance must be placed on the outer PN code to provide discrimination between signals arriving at the mobile unit from different cells. However, all the signals transmitted by a cell are orthogonal to each other and thus do not contribute interference to each other. This eliminates the majority of the interference in most locations, allowing a higher capacity to be obtained" (i.e. "second parallel code multiplying operation is performed for at least 2 of the L codewords") [column 10 lines 4-68 & column 11 lines 1-17].

Claims 14 & 28:

Gilhousen discloses a method and an apparatus for decoding $M \times N$ (symbols in which a first codeword of length N of a first set of K codewords has been spread by a second codeword of length M of a second set of L codewords, the first codeword identifying a first information and the second codeword identifying a second information as in Claims 1 & 16 respectively above comprising,

- "All signals transmitted by a cell or one of the sectors of the cell share the same outer PN codes for the I and Q channels. The signals are also spread with an inner orthogonal code

generated by using Walsh functions. A signal addressed to a particular user is multiplied by the outer PN sequences and by a particular Walsh sequence, or sequence of Walsh sequences, assigned by the system controller for the duration of the user's telephone call. The same inner code is applied to both the I and Q channels resulting in a modulation which is effectively bi-phase for the inner code.

It is well known in the art that a set of n orthogonal binary sequences, each of length n , for n any power of 2 can be constructed, see Digital Communications with Space Applications, S. W. Golomb et al., Prentice-Hall, Inc, 1964, pp. 45-64. In fact, orthogonal binary sequence sets are also known for most lengths which are multiples of four and less than two hundred. One class of such sequences that is easy to generate is called the Walsh function, also known as Hadamard matrices.

A Walsh function of order n can be defined recursively as follows: $W(1) = 1$ where W' denotes the logical complement of W , and $W(2n) = W(n) \cdot W'(n)$.

Thus, $W(8)$ is as follows: A Walsh sequence is one of the rows of a Walsh function matrix. A Walsh function of order n contains n sequences, each of length n bits:

A Walsh function of order n (as well as other orthogonal functions) has the property that over the interval of n code symbols, the cross-correlation between all the different sequences within the set is zero, provided that the sequences are time aligned with each other. This can be seen by noting that every sequence differs from every other sequence

in exactly half of its bits. It should also be noted that there is always one sequence containing all zeroes and that all the other sequences contain half ones and half zeroes.

Neighboring cells and sectors can reuse the Walsh sequences because the outer PN codes used in neighboring cells and sectors are distinct. Because of the differing propagation times for signals between a particular mobile's location and two or more different cells, it is not possible to satisfy the condition of time alignment required for Walsh function orthogonality for both cells at one time. Thus, reliance must be placed on the outer PN code to provide discrimination between signals arriving at the mobile unit from different cells. However, all the signals transmitted by a cell are orthogonal to each other and thus do not contribute interference to each other. This eliminates the majority of the interference in most locations, allowing a higher capacity to be obtained" (i.e. "second parallel code multiplying operation is performed for all of the L codewords") [column 10 lines 4-68 & column 11 lines 1-17].

Claims 15 & 29:

Gilhousen discloses a method and an apparatus for decoding $M \times N$ (symbols in which a first codeword of length N of a first set of K codewords has been spread by a second codeword of length M of a second set of L codewords, the first codeword identifying a first information and the second codeword identifying a second information as in Claims 1 & 16 respectively above comprising,

- "All signals transmitted by a cell or one of the sectors of the cell share the same outer PN codes for the I and Q channels. The signals are also spread with an inner orthogonal code generated by using Walsh functions. A signal addressed to a particular user is multiplied

by the outer PN sequences and by a particular Walsh sequence, or sequence of Walsh sequences, assigned by the system controller for the duration of the user's telephone call. The same inner code is applied to both the I and Q channels resulting in a modulation which is effectively bi-phase for the inner code.

It is well known in the art that a set of n orthogonal binary sequences, each of length n , for n any power of 2 can be constructed, see Digital Communications with Space Applications, S. W. Golomb et al., Prentice-Hall, Inc, 1964, pp. 45-64. In fact, orthogonal binary sequence sets are also known for most lengths which are multiples of four and less than two hundred. One class of such sequences that is easy to generate is called the Walsh function, also known as Hadamard matrices.

A Walsh function of order n can be defined recursively as follows: $W(1) = 1$ where W' denotes the logical complement of W , and $W(2n) = \begin{bmatrix} W(n) \\ W'(n) \end{bmatrix}$.

Thus, $W(8)$ is as follows: A Walsh sequence is one of the rows of a Walsh function matrix. A Walsh function of order n contains n sequences, each of length n bits.

A Walsh function of order n (as well as other orthogonal functions) has the property that over the interval of n code symbols, the cross-correlation between all the different sequences within the set is zero, provided that the sequences are time aligned with each other. This can be seen by noting that every sequence differs from every other sequence in exactly half of its bits. It should also be noted that there is always one sequence containing all zeroes and that all the other sequences contain half ones and half zeroes.

Neighboring cells and sectors can reuse the Walsh sequences because the outer PN codes used in neighboring cells and sectors are distinct. Because of the differing propagation times for signals between a particular mobile's location and two or more different cells, it is not possible to satisfy the condition of time alignment required for Walsh function orthogonality for both cells at one time. Thus, reliance must be placed on the outer PN code to provide discrimination between signals arriving at the mobile unit from different cells. However, all the signals transmitted by a cell are orthogonal to each other and thus do not contribute interference to each other. This eliminates the majority of the interference in most locations, allowing a higher capacity to be obtained" (i.e. "at least one codeword are fewer than all of the L codewords, and the at least one codeword is selected by accumulating energy after the first parallel code multiplying operation for each possible codeword after the first parallel code multiplying operation, and selecting the at least one codeword having greatest energy") [column 10 lines 4-68 & column 11 lines 1-17].

Claims 25 & 26:

Gilhousen discloses an apparatus for decoding $M \times N$ (symbols in which a first codeword of length N of a first set of K codewords has been spread by a second codeword of length M of a second set of L codewords, the first codeword identifying a first information and the second codeword identifying a second information as in Claim 16 above comprising,

- "The pilot signal transmitted by each sector of each cell is of the same spreading code but with a different code phase offset. Phase offset allows the pilot signals to be distinguished from one another thus distinguishing originating cell-sites or sectors. Use of the same

pilot signal code allows the mobile unit to find system timing synchronization by a single search through all pilot signal code phases. The strongest pilot signal, as determined by a correlation process for each code phase, is readily identifiable. The identified strongest pilot signal generally corresponds to the pilot signal transmitted by the nearest cell-site. However, the strongest pilot signal is used whether or not it is transmitted by the closest cell-site.

Upon acquisition of the strongest pilot signal, i.e. initial synchronization of the mobile unit with the strongest pilot signal, the mobile unit searches for another carrier intended to be received by all system users in the cell. This carrier, called the synchronization channel, transmits a broadcast message containing system information for use by the mobiles in the system. The system information identifies the cell-site and the system in addition to conveying information which allows the long PN codes, interleaver frames, vocoders and other system timing information used by the mobile unit to be synchronized without additional searching. Another channel, called the paging channel may also be provided to transmit messages to mobiles indicating that a call has arrived for them, and to respond with channel assignments when a mobile initiates a call.

The mobile unit continues to scan the received pilot carrier signal code at the code offsets corresponding to cell-site neighboring sector or neighboring transmitted pilot signals. This scanning is done in order to determine if a pilot signal emanating from a neighboring sector or cell is becoming stronger than the pilot signal first determined to be strongest. If, while in this call inactive mode, a neighbor sector or neighbor cell-site pilot

signal becomes stronger than that of the initial cell-site sector or cell-site transmitted pilot signal, the mobile unit will acquire the stronger pilot signals and corresponding sync and paging channel of the new sector or cell-site.

When a call is initiated, a pseudonoise (PN) code address is determined for use during the course of this call. The code address may be either assigned by the cell-site or be determined by prearrangement based upon the identity of the mobile unit. After a call is initiated the mobile unit continues to scan the pilot signal transmitted by the cell-site through which communications are established in addition to pilot signal of neighboring sectors or cells. Pilot signal scanning continues in order to determine if one of the neighboring sector or cell transmitted pilot signals becomes stronger than the pilot signal transmitted by the cell-site the mobile unit is in communication with. When the pilot signal associated with a neighboring cell or cell sector becomes stronger than the pilot signal of the current cell or cell sector, it is an indication to the mobile unit that a new cell or cell sector has been entered and that a handoff should be initiated" (i.e. "the first information comprises a channel quality indication, and wherein the second information comprises a sector identifier") [column 5 lines 63-68 & column 6 lines 1-55].

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to the applicant's disclosure.

- a. Blakeney II (US-5267261-A)
- b. Bi (US-5136612-A)

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- c. Bottomley (US-5237586-A)
- d. Dent (US-5353352-A)
- e. Wheatley III (US-5383219-A)
- f. Harrison (US-5406629-A)
- g. Tsuboka (US-4446530-A)

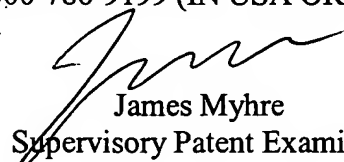
7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Oscar Louie whose telephone number is 571-270-1684.

The examiner can normally be reached Monday through Thursday from 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Myhre, can be reached at 571-270-1065. The fax phone number for Formal or Official faxes to Technology Center 2100 is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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01/24/2007


James Myhre
Supervisory Patent Examiner